

WHAT IS CLAIMED IS:

1. In a cyclic linear block code error correcting decoder having at least four blocks, said blocks including a syndrome generating block, an error polynomial
5 block, an error location block, and an error magnitude block, a method for performing data error correction of a codeword, said method comprising the acts of:

calculating a syndrome from said codeword in said syndrome generating block;

10 generating an error polynomial from said syndrome in said error polynomial block;

determining an error location from said error polynomial in said error location block; and

calculating an error magnitude from said error polynomial in said error
15 magnitude block,

said method characterized in that at least one of said at least four blocks is adapted to transmit an inactivity message to other ones of said at least four blocks.

20 2. The method of claim 1 further comprising the act of:

correcting said codeword responsive to said error location and said error magnitude.

25 3. The method of claim 1 wherein said inactivity message is a ready-to-receive message.

4. The method of claim 1 wherein said inactivity message is a ready-to-send message.

30 5. The method of claim 1 wherein said error polynomial block is a Euclid's algorithm block.

6. The method of claim 1 wherein said error polynomial block is a Berlekamp-Massey algorithm block.

7. The method of claim 1 wherein said error location block is a Chien
5 search block.

8. The method of claim 1 wherein said error magnitude block is a Forney algorithm block.

10 9. The method of claim 1 wherein the acts associated with said error location block and said error magnitude block are performed within a combined Chien/Forney block.

10. The method of claim 1 wherein said cyclic linear block code error
15 correcting decoder is a Reed-Solomon decoder.

11. A decoder for performing data error detection within a codeword, said decoder comprising:

means for calculating a syndrome from said codeword;

20 means for generating an error polynomial from said syndrome;

means for determining an error location from said error polynomial; and

means for calculating an error magnitude from said error polynomial,

said decoder characterized in that an adaptation to send an intra-decoder inactivity message is incorporated within at least one component selected from a
25 group comprising said means for calculating said syndrome, said means for generating said error polynomial, said means for determining said error location, and said means for calculating said error magnitude.

12. The decoder of claim 11 further comprising a means for correcting
30 said codeword responsive to receipt of said codeword, said error location, and said error magnitude as inputs.

13. The decoder of claim 11 wherein said decoder is a Reed-Solomon decoder.

14. The decoder of claim 11 wherein said intra-decoder inactivity message
5 is a ready-to-receive message.

15. The decoder of claim 11 wherein said intra-decoder inactivity message
is a ready-to-send message.

10 16. The decoder of claim 11 wherein said means for generating an error
polynomial is a Euclid's algorithm block.

17. The decoder of claim 11 wherein said means for generating an error
location block is a Chien search block.

15 18. The decoder of claim 11 wherein said means for calculating an error
magnitude is a Forney algorithm block.

19. A decoder for performing data error detection within a codeword, said
20 decoder comprising:

a syndrome generator for calculating a syndrome from said codeword;

an error polynomial generator for generating an error polynomial from said
syndrome;

25 an error location generator for determining an error location from said error
polynomial; and

an error magnitude generator for calculating an error magnitude from said
error polynomial,

30 said decoder characterized in that an adaptation to send an intra-decoder
inactivity message is incorporated within at least one component selected from a
group comprising said syndrome generator, said error polynomial generator, said
error location generator, and said error magnitude generator.

20. The decoder of claim 19 further comprising an error corrected codeword generator for correcting said codeword responsive to receipt of said codeword, said error location, and said error magnitude as inputs.